Customer Churn Prediction

Business-Focused Retention Analysis

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1: Overview

Customer churn represents a significant business challenge because losing existing customers directly reduces revenue and increases the cost of acquiring new ones. This project focuses on using customer data to identify patterns associated with churn and to support proactive retention strategies. The goal is to help the business understand which customers are at risk of leaving and to act early to improve customer loyalty.

2: Business and Data Understanding

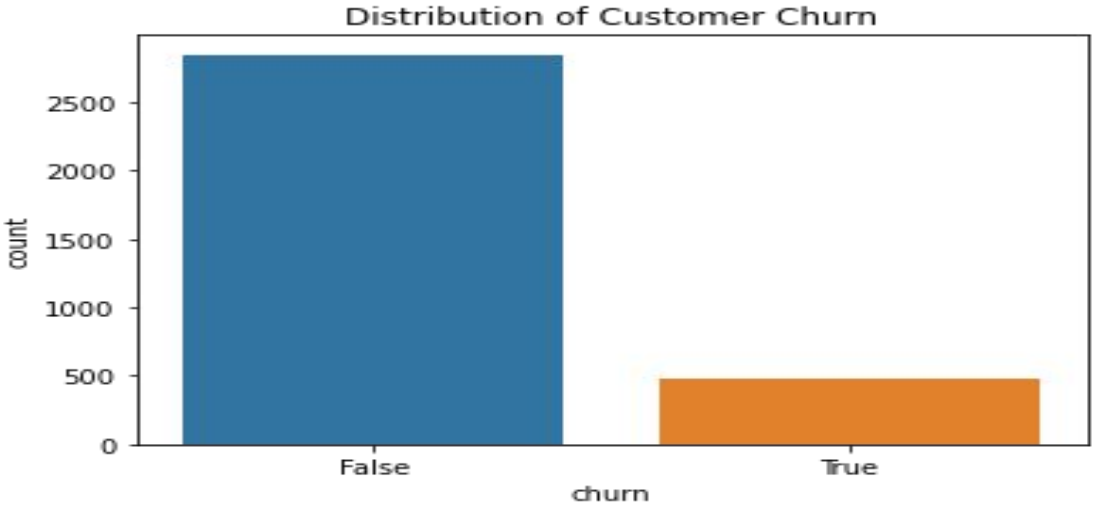
a) Business Problem

The business problem addressed in this analysis is customer churn, which occurs when customers stop using the company's services. High churn rates negatively affect profitability and long-term growth. By identifying customers likely to churn, the business can intervene earlier with targeted engagement and retention initiatives.

b) Data Overview

The dataset used in this analysis contains information on 3,333 telecom customers, including service usage, plan details, and customer service interactions. The outcome variable indicates whether a customer churned or remained with the company. This data provides valuable insights into customer behavior and retention patterns.

3: Customer Churn Distribution



The churn distribution shows that most customers remain with the company, while a smaller portion choose to leave. Although churned customers represent a minority, they have a disproportionate impact on revenue. This imbalance highlights why accurately identifying at-risk customers is critical, even when churn cases are fewer in number.

4: Why Classification Modeling Was Used

This business problem is best addressed using classification because the outcome is a clear yes-or-no decision: a customer either churns or does not churn. Classification models help the business assess churn risk by learning from historical customer behavior and identifying patterns that commonly precede customer exit. This allows decision-makers to focus attention on customers who may require intervention.

5: Modeling Approach

A baseline churn prediction model was developed using historical customer data. The model learns relationships between customer behavior and churn outcomes and produces predictions that estimate the likelihood of a customer leaving. Rather than replacing human judgment, the model acts as a decision-support tool that helps prioritize retention efforts.

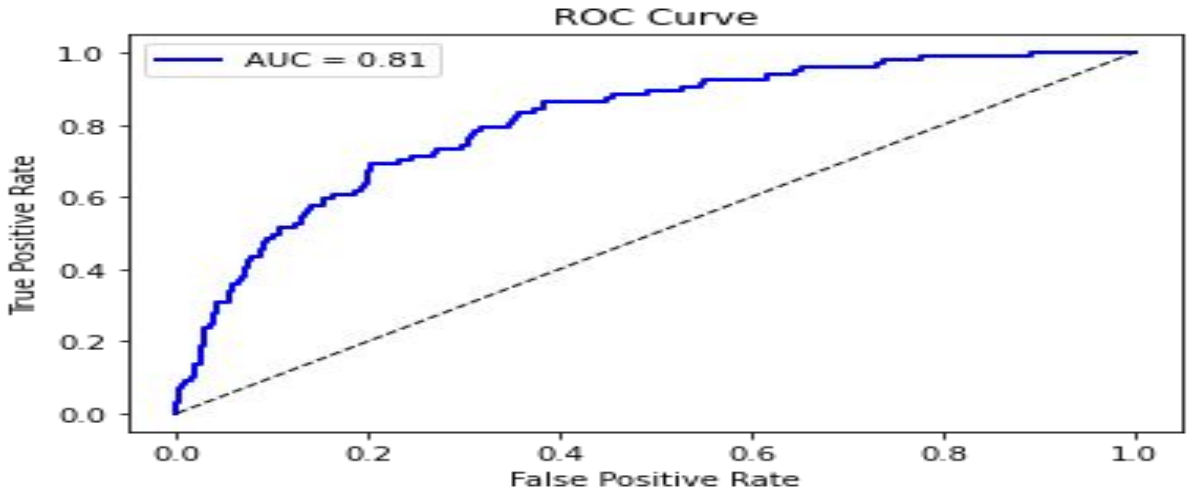
6: Model Evaluation

A) Classification report table

	precision	recall	f1-score	support
False	0.88	0.96	0.92	570
True	0.53	0.25	0.34	97
accuracy			0.86	667
macro avg	0.71	0.61	0.63	667
weighted avg	0.83	0.86	0.84	667

Model performance was evaluated based on how well it identifies customers who stay and how effectively it detects customers who are likely to churn. The model performs strongly in identifying loyal customers but has more difficulty detecting churned customers. This is expected due to the smaller number of churn cases and reflects a common challenge in churn prediction problems.

6 B): ROC Curve



This chart shows the model's ability to differentiate between customers who are likely to stay and those at risk of leaving. The area under the curve (AUC) is 0.81, which indicates the model is fairly good at identifying high-risk customers. While not perfect, it provides actionable insights for proactive retention strategies.

7: Business Interpretation of Results

From a business perspective, the model’s predictions should be interpreted as risk indicators rather than guarantees. Customers flagged as high risk are more likely to churn than others, but they are not certain to leave. These insights allow the business to act earlier by engaging customers before dissatisfaction leads to churn.

8: Recommendations

Business Recommendations

- Focus retention campaigns on high-risk customers
- Use targeted offers and proactive engagement
- Monitor service usage and support interactions

9: Next Steps

Future Improvements

- Improve churn detection accuracy
- Apply advanced models
- Add more behavioral data
- Regularly update the model

10: Thank You

Thank you for your time and attention.

I welcome any questions or discussion on how these insights can support customer retention strategies.

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